

## The Occurrence of Rutin in a Wild Cherry, *Prunus melanocarpa* (A. Nels.) Rydb.

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In connection with the researches being conducted at this Laboratory<sup>2</sup> on the production of rutin for medicinal use a species of wild cherry was examined with the result that significant quantities of rutin were found in the leaves. This is the first species of the genus *Prunus* from which this glucoside has been isolated, although the presence of other flavonol glucosides in different species of the genus has been reported.

Rochleder<sup>3</sup> found a trace of a quercetin glucoside in *P. cerasus* L., and Finnemore<sup>4</sup> isolated quercimeritrin from a commercial bark probably of *P. emarginata* Walp. Power and Moore<sup>5</sup> obtained less than 0.1% of a quercetin glucoside which they named serotrin from the leaves of *P. serotina* Ehrh. This substance melted at the same temperature as quercimeritrin but on comparison with an authentic sample the authors concluded that it was a different substance.

Rutin has now been found in the leaves of "black chokecherry" (*P. melanocarpa* (A. Nels.) Rydb.) in substantial quantities. This species ranges from Alberta and British Columbia southward to California and New Mexico<sup>6</sup> in accessible

(1) One of the Laboratories of the Bureau of Agricultural & Industrial Chemistry, Agricultural Research Administration, United States Department of Agriculture. Article not copyrighted.

(2) J. F. Couch, C. F. Krewson, J. Naghschi and M. J. Copley, *Bur. Agri. Ind. Chem.*, AIC-115, April, 1946. [Processed.]

(3) F. Rochleder, *S-Ber. Wien. Acad.*, Abt. II, 59, 219-247 (1869).

(4) H. Finnemore, *Pharm. J.*, 85, 604-607 (1910).

(5) F. B. Power and C. W. Moore, *J. Chem. Soc.*, 97, 1099-1112 (1910).

(6) I. Tidestrom, *Flora of Utah and Nevada*, "U. S. Natl. Herbarium," Vol. 25, Gov't. Printing Office, Washington, D. C., 1925, p. 285.

localities and may prove to be a commercial source of the drug. Several samples of leaves collected at different stages of growth and at two different altitudes were examined. The leaves were collected in 1936 and 1937 near the Salina Experiment Station, Salina, Utah, in connection with studies on poisoning of livestock by cyanogenetic plants. They were air dried and had been stored in the laboratory for ten years. Crude rutin was obtained from a composite lot of these samples in 1937 but was not investigated further at that time. Analyses of the samples are in Table I.

TABLE I

Lot no.	Date collected, 1936	Approximate altitude, ft.	Moisture, <sup>7</sup> %	Rutin, <sup>7</sup> % mfb
47-7	June 15	8000	6.00	1.57
47-6	Aug. 17	8000	7.20	1.44
47-9	Aug. 20	8500	6.15	3.13
47-10	Composite	8000	7.60	1.63
1937				
47-8	June 17	8500	6.40	3.88

The figures indicate a considerably greater content of rutin in leaves collected at the higher altitude but do not show much difference between young (June collections) and older (August) leaves.

#### Experimental

A quantity of the air-dried leaves (6,646 g.) was coarsely powdered, moistened with alcohol and extracted in a glass

(7) Analyses made by C. S. Fenske, Jr., of this Laboratory.

percolator with alcohol. The solvent was distilled from the percolate and the greenish residue was thoroughly extracted with boiling distilled water. The water solution was filtered from the fatty materials and allowed to cool. After standing several days a considerable quantity of brown flocculent material separated. This was filtered and redissolved in boiling water. The filtered solution deposited the substance on cooling. The crude rutin (24.0 g.) was greenish in color and contained 88% of the pure glucoside. This was bottled and preserved for several years. The rutin (2 g.) was purified by dissolving in alcohol (50 ml.), filtering from some amorphous matter, and diluting to 500 ml. with water containing 2 ml. of concentrated hydrochloric acid. The rutin which slowly precipitated during the ensuing twenty-four hours was of bright yellow color and crystallized in the characteristic microscopic fan-shaped bundles of needles. It was filtered, washed with water and dried at 110°. The plastic range ("melting point") was 172-174° raised by recrystallization from alcohol and from water to 190-192°. A spectrophotometric examination by W. L. Porter identified the substance as rutin by the following constants: The ultraviolet absorption spectrum of the anhydrous sample was characterized by absorption maxima near 3627 and 2577 Å., specific extinction coefficient, 32.6 liter g.<sup>-1</sup> cm.<sup>-1</sup> at 3627 Å., extinction ratio of 0.875 for wave lengths 3752 and 3627 Å. The corresponding figures for authentic rutin are: 3627 and 2577 Å., 32.5 at 3627 Å. and 0.875.

Anal.<sup>8</sup> Calcd. for C<sub>27</sub>H<sub>30</sub>O<sub>16</sub>: C, 53.11; H, 4.95. Found: C, 52.92; H, 4.99.

#### Summary

Rutin has been isolated in significant quantities from black chokecherry, a species native to the mountain region of the western United States.

(8) Analysis by C. L. Ogg.

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